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among those of a more serious nature may be mentioned the reproduction (pp. 343, 344) of Scudder's original notation attributing a day song and a night song to *Oecanthus niveus*. These supposed "day" and "night" songs have long been known to be the songs of distinct species, and so far back as 1893 Scudder recognized his error and stated that a revision of his score was desirable.

The plates are all original; most of the text-figures have been previously used and the source is acknowledged, though not in all cases satisfactorily.

Very few of the illustrations, either in the plates or in the text, can be commended; this can be clearly seen by comparing the colored plates with those of Holland's *Butterfly Book*, and the text-figures with those from the same blocks as used in various publications of the United States Department of Agriculture and elsewhere; in the make-up of the book the plates are poorly placed.

Inconsistencies in typography and lack of ordinary care in proofreading are so apparent that even an inexpert corrector of the press could not turn many pages without finding glaring errors. S. H.

Michaelsen's Oligochæta.[1] — When Dr. Michaelsen began his work he had before him no easy task, and it is safe to say that no student of this class of animals could have discharged his duty in a more satisfactory manner. The museum in Hamburg is in possession of the largest, and as regards species most complete, collection of Oligochæta, and when we remember that it has been brought together entirely by Dr. Michaelsen, it may be readily understood that the author has been eminently fitted for his work. The literature of this class of animals is already very large, and it is also so scattered that it is impossible for any one living outside of the large literary and scientific centers of Europe to procure or have access to all. Dr. Michaelsen has had access to all this literature, and has personally examined almost every species described by different authors, as far as they yet exist, and the result has been a work of the very highest value, and one which no student of the group can do without.

The first part of the book contains a list of abbreviations for reference to literature. It seems to the reviewer that it would have been better if such abbreviations had been adopted as are used by the publications abbreviated. This suggestion refers equally to almost every publication issued, and is a subject worthy of international consideration. Next after the abbreviations we come to a systematic index. When we consider that this index of families and species occupies not less than sixteen pages in double columns, we may begin to comprehend the enormous increase in described species during the last few years. All in all, there are probably 1100 species of Oligochæta now sufficiently well described to be readily identified. As is well known, the majority of species of this class can only be identified by anatomical characters. This makes identification difficult without the aid of illustrations, and it is much to be regretted that so few are found in this otherwise so valuable monograph. The morphological part is confined to ten pages, and it is here that the want of illustrations is especially felt. The author introduces a number of new words to indicate structures, such as tanilobic, zygolobic, prolobic, etc., according to the various and different encroachments of the prostomium on the anterior somite, etc. Many of these names have been derived from the Greek and Latin and are most happily found, and we can only regret that the author has not seen fit to revise also the general nomenclature to such an extent that students of other languages could readily understand what parts and organs are referred to. Why not use, for instance, "spermatheca" instead of "samentasche," etc.? The larger part of the book is devoted to a systematic description of the species, their genera and families. These descriptions are models of conciseness, including all the principal exterior and interior characters necessary to define the species. A large number of names have been changed, priority being given to the oldest ones, according to the rules adopted by the German society of naturalists. In this department the author has made very thorough studies, and as a consequence we meet with many novelties which will be referred to in their respective places. Every genus is preceded by a key for identifying the species. Many will object to the style of key adopted. In our opinion the most desirable key in all systematic works is the one which, besides facilitating the finding of the species, at the same time gives us an idea of the systematic arrangement and relationships. The system adopted by the author gives no idea of the affinity of the species, but simply facilitates finding them. In adopting the present style of key the systematic review of the genera and species certainly suffers. This is especially the case in large genera, as, for instance, Dichogaster (Benhamia, etc.), where the species number over 150.

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[1] Michaelsen, W. *Das Tierreich*. 10. Lieferung, Vermes, Oligochæta. Berlin, Friedlaender, 1900. xxix + 575 pp., 13 figs.

The treatment of the limicolide groups should prove especially interesting to the American students, as the scattered literature of these groups is especially difficult of access, as much of it is in Slavic languages. We are glad to see that the genus Ilyodrilus has been restricted to its three California species and separated from Branchiura, with which genus it has really no affinity. The treatment of Enchytræidæ is especially good, the author having previously studied this family, and being the first one to bring order out of the chaos which existed previous to his monograph on that family. Among innovations we remark the genus Lumbricillus substituted for Pachydrilus. It is to be regretted that this change should have been necessary, as we have already too many names with a similar sound. The family which probably interests us most is the large one of Megascolecidæ. This family is made to contain the majority of North American terrestrial earthworms. The most interesting fact connected with the family as defined by the author is that it is made to contain Ocnerodrilus as well as Diplocardia, Trigaster, Plutellus, Chilota, etc. The genus Achantodrilus, which a year ago contained more species than almost any other genus, is now restricted to a single species. The Old-World species of the once large genus have now been separated from the New Zealand ones, while the majority of the species have been referred to the genus Notiodrilus, etc. It is most interesting to note that as a result of the author's investigations we now find Achantodrilus placed next to Microscolex and its allied genera, while a few years ago these were referred to different families. The genus Plutellus has been resurrected, as is quite proper, but what will astonish the general student more is that Plutellus and Pheretima have been referred to the same family, — the reason being that we now place very little importance on the number of setæ in each somite, as long as the interior organs resemble each other. The author has had special opportunity to examine Kinberg's types in the Stockholm Museum. As a result of this investigation it has been possible to identify nearly all of Kinberg's genera and most of his species, and consequently many later names have to give way to the old Kinberg names, —Pheretima instead of Perichæta, etc. The subfamily Diplocardinæ has been well treated, and so has its near relative Trigastrinæ. The Zapotecia has been raised to a full genus, it previously having been considered a subgenus only. Dichogaster is made to contain both Benhamia and Dichogaster, which certainly is an easy way out of the difficulty in defining the relationship of these two genera. But even the author's lately established genus Balanta has had to give way to the all-engulfing Dichogaster. A division into subgenera retaining such names as Benhamia, Balanta, and Dichogaster would probably have been more in accordance to the ideas of several other investigators, and would have served to give a better review of this genus — we confess one of the most puzzling in the class. Under Ocnerodrilinæ we now meet with the genus Kerria, the structure of which is the one that gave the clue to the relationship of these genera with one and two pairs of prostates. Several of the subgenera under Ocnerodrilus have been raised to independent genera. We have thus Nematogenia, Pymeodrilus, and Ocnerodrilus side by side. *Nematogenia panamænsis* has been raised to an independent species. Among the subgenera Enicmodrilus has been fused with Ilyogenia. It would have been an improvement if the species followed each other in the general text in the same manner as in the key, or *vice versa*: this is rarely the case. The name Geoscolecidæ has been changed to Glossoscolecidæ, the latter being an older name.

The last family, Lumbricidæ, has more of a negative interest to students in this country, as comparatively few indigenous species are found here. While it is true that several species of this family have been described as new from North America, it is doubtful if they really are indigenous, and we may find that the species so considered are mere importations. This fact is certain, that no new Lumbricidæ have been found west of the Rocky Mountains. All the species on the Pacific coast are undoubtedly importations from Europe, and a very careful search by the reviewer has failed to reveal a single new species of this family between Alaska and Central America. This is the more interesting as the Pacific coast is in many respects related to Japan and eastern Asia. Thus Pillsbury has shown that the dart-bearing Helices are only found on the Pacific coast of North America, while they are widely distributed through the continents of Europe and Asia. Similarly among the Crustacea the genus Astacus is found all along the Pacific coast, and in Asia and Europe, while the genus Cambarus is found only in central and eastern North America. Among plants also there is a similarity between the Pacific coast and Japanese forms. But when we come to the earthworms the conditions are different. As far as we know, not a single species is found common to Japan or Asia and the Pacific coast. The indigenous California species seem all to be related to antarctic ones, or rather to species from south of the equator and to genera which with good reason may be considered as having emanated from a former antarctic continent. The indigenous terrestrial species of Lumbricidæ found in North America should for the present be looked upon with suspicion in connection with their true habitat. The family of Lumbricidæ has received model treatment in Michaelsen's monograph. The book ends with a very perfect register, — a desideratum not always found in transatlantic scientific works. Taking it all in all, this splendid monograph cannot be too highly praised. It is not only indispensable to all students of the class, but it is so complete that for the identification of the species the older literature is made almost superfluous. As regards nomenclature, Dr. Michaelsen's ideas are almost final; while as regards classification they are sure to remain unchanged for many years. A perusal of the volume shows one thing which should be encouraging to all students of earthworms; that is, compared to the terrestrial Oligochæta the limicolide forms are almost unknown, and it is evident that it is among the latter that the greatest novelties will be found in the future.

GUSTAV EISEN.

BOTANY.

A Botany for Children. — Professor Atkinson in an attractive little book entitled *First Studies in Plant Life*[1] follows the current practice of presenting vital phenomena to the young beginner, rather than details of form. The first part gives a brief account of the growth and parts of plants, the second and third discuss their work and behavior, the fourth gives the life story of a sweet pea, an oak, a fern, a moss, and a mushroom, and the fifth treats of the battles of plants in the world. The illustrations are of exceptional excellence. Many ingenious and simple experiments are introduced. Much of the text seems likely to interest young people, and any teacher may gain valuable suggestions from the book.

A prevailing fault, however, is a more or less obvious "writing down" to the young reader, becoming at times mere sentimentality such as intelligent children resent. It is hard to see how the following passage, for example, can serve any useful purpose: "Some will

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[1] Atkinson, George Francis, Ph.B., Professor of Botany, Cornell University. *First Studies of Plant Life*. Boston, Ginn & Company, 1901. 12mo. xii + 266 pp., 308 figs.